New Interpretation Instruments from Carl Zeiss Jena

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ABSTRACT:

The increasing use of different types of photographs for photointerpretation requires new interpretation instruments, which on the one side offer powerful observational possibilities and on the other side allow digital data recording and transfer to GIS/LIS. The new Zeiss-line of interpretation instruments fulfills both requirements.

Zusammenfassung:

Die zunehmende Verwendung unterschiedlicher Photomaterialien für die Photointerpretation erfordert neue Gerätetypen, die einerseits über sehr leistungsvolle Betrachtungssysteme verfügen und andererseits digitale Datenerfassung und Datenübertragung in GIS/LIS anbieten. Die neue Zeiss-Linie von Interpretationsgeräten erfüllt beide Forderungen.

KEY WORDS: Photointerpretation, Remote sensing, Instruments, Data Aquisition, GIS/LIS

1. Introduction

The general dominance of digital image processing in photointerpretation / remote sensing over the classical visual interpretation did not happen. On the contrary both methods are used in praxis. The only possible differentiation is, that digital data from space is evaluated more or less digital and photographic images taken from an aircraft are evaluated more or less visual. For this background the decision of Carl Zeiss Jena must be seen, to develop a new generation of interpretation instruments. On the one side these instruments have to continue with the high optical performance of the well known INTERPRETOSKOP, on the other side they have to offer the possibility of digital data aquisition and the transfer of data to widely used GIS/LIS. The individual instruments of this family are

PHOTOPRET for the inspection of roll-film

VISOPRET 10 for the interpretation with a zoom-stereoscope

VISOPRET 20 for the interpretation with a mirror stereoscope

2. PHOTOPRET

The PHOTOPRET (Fig. 1) mainly serves for the inspection of film strips with respect to quality of aerial photographs (film development process, image motion effects, resolution, clouds etc.), the preparation of the photogrammetric mapping process (flight route mapping, aerial triangulation etc.) and the thematic interpretation (quick look for discovering sensitive areas, preparation of detailed interpretation).

The PHOTOPRET is basically a desk-top light table for roll film with a maximal width of 300 mm. the roll film is transported by handwheels or motorized. As means of observation either a large-field magnifier (1.8 x) or a stereomicroscope with variable and higher magnification (3.2 x to 32 x) can be attached to the swivel arm.

3. VISOPRET

The name VISOPRET stands for a family of four instruments. Their common base is the mechanical design (cross-slide system) which may be digitized (VISOPRET DIG) or not and which may be equipped with a zoom-stereoscope (VISOPRET 10, Fig. 2) or a mirror-stereoscope (VISOPRET 20, Fig. 3).

3.1. Mechanical Design

The VISOPRET operates according to the principle of stationary optics and mobile image carriages.

The photos of a stereopair are fixed on two image carriages movable in X - and Y - directions by hand (free-hand movement). In both directions the ways are long enough to evaluate within the complete model. Fine settings in X and Y are realized by a mechanical joy-stick. The maximum image format is 240 mm x 240 mm. Illumination is in transmitted or incident lights.
To eliminate and/or measure parallaxes, two setting elements are arranged at the image carriages. The extended version VISOPRET DIG is equipped with measuring systems for digitizing image coordinates (with linear encoders) and parallaxes (with shaft encoders). A circuit board called "counter interface" has to be put into the bus of a PC. It realizes data transfer to the PC, where the measured data are processed by means of the software.

3.2. Optical System

The improvement of aerial cameras and aerial films requires higher resolutions to be realized in the observational systems of photogrammetric instruments. Otherwise the high potential of aerial photographs is not usable for interpretation. For this reason the VISOPRET 10 is equipped with a powerful zoom-stereoscope. With two sets of eyepieces magnifications result of 3.5 x to 15.5 x respectively 7 x to 31 x.

Team work is an integral part of photointerpretation. Therefore the VISOPRET 10 may be equipped with an instruction set of eyepieces, which is very useful in education and for training purposes too.

Zeiss Jena photogrammetrical instruments are well known for their superior optical quality. Also the optical system of the VISOPRET 10 is a trendsetter with respect to magnification, viewing field diameter (= 210 / v) and resolution (100 lp/mm for v = 15 x).

For simple interpretation and measuring tasks a mirror stereoscope with magnifications of 3.5 x and 8 x may be used instead of the zoom-stereoscope.

3.3. Software

Basic features of the VISOPRET-software are the wide range of applications and the easy use. The software is subdivided into

  Data Management and Orientation

  Driver for Mapping Software

  Digital Mapping

Data Management and Orientation

This software is based on many years of experience of Zeiss with analytical plotters and their software and on modern PC software tools. Two different packages are offered:

  P-CAP and VISOCAP

P-CAP for VISOPRET is based on the proofed equal named P 3 software package. The user is guided by the comfortable Micorosoft Windows-technique. P-CAP allows the

  management of camera data, control points and orientation data

  interior, relative and absolute orientation with interactive correction possibilities

  pointwise measurement of photo-, model-, terrain- or object-coordinates.

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If orientation is finished, orientation data will be stored in the Zeiss PHOREX-Format. This allows the data exchange with the Zeiss analytical Plotters Planicomp and DICOMAT.

VISOCAP is organized into

  Management of camera data and control points

  Orientation od stereopairs (interior, relative and absolute orientation)

  Plotting with VISOMAP

Driver for Mapping Software
Drivers are offered for AutoCAD (Version 11.0) and Microstation PC (Version 4.0). Both drivers offer the output of data in DXF- and IGES-format. Additionally Micro-station PC offers the DGN-format for using the data with different hardware/software platforms.

VISOMAP mapping software
VISOMAP offers numerous functions for graphical and digital map production including among others

  straight-line connections
  circular interpolation
  curve interpolation
  polygon
  parallel line and shades
  symbols
  rectangularity

These functions are supplemented by many subfunctions (f.i. close a polygon, area computation). During the mapping process results are presented on the graphical monitor. The data may be transformed into the DXF-format for use in other interactive graphic systems.
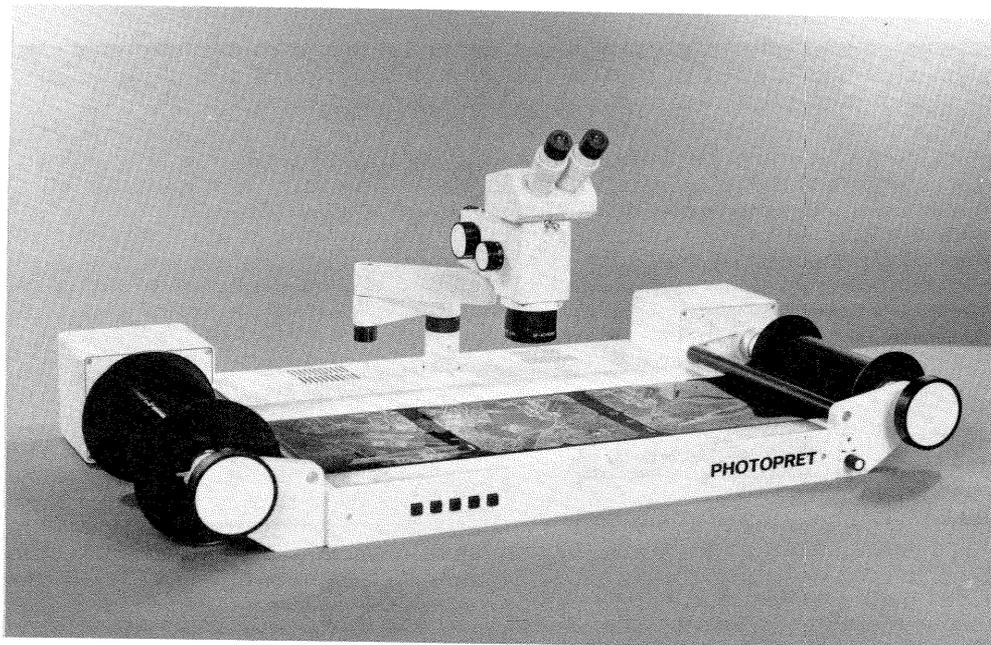
Fig 1 Zeiss Jena PHOTOPRET

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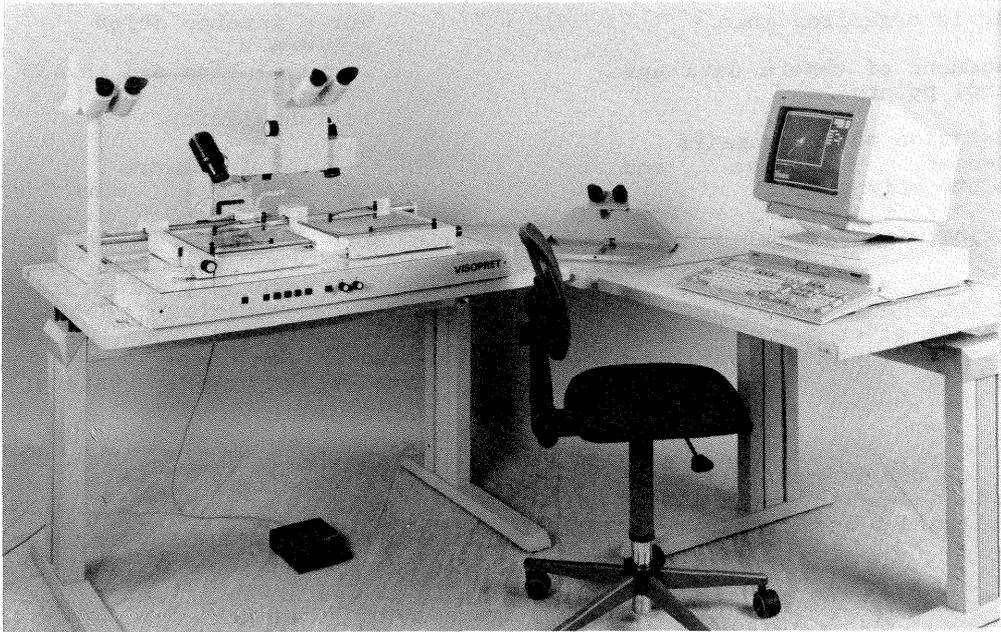
Fig 2 Zeiss Jena VISOPRET 10-DIG
       with instruction set of eyepieces
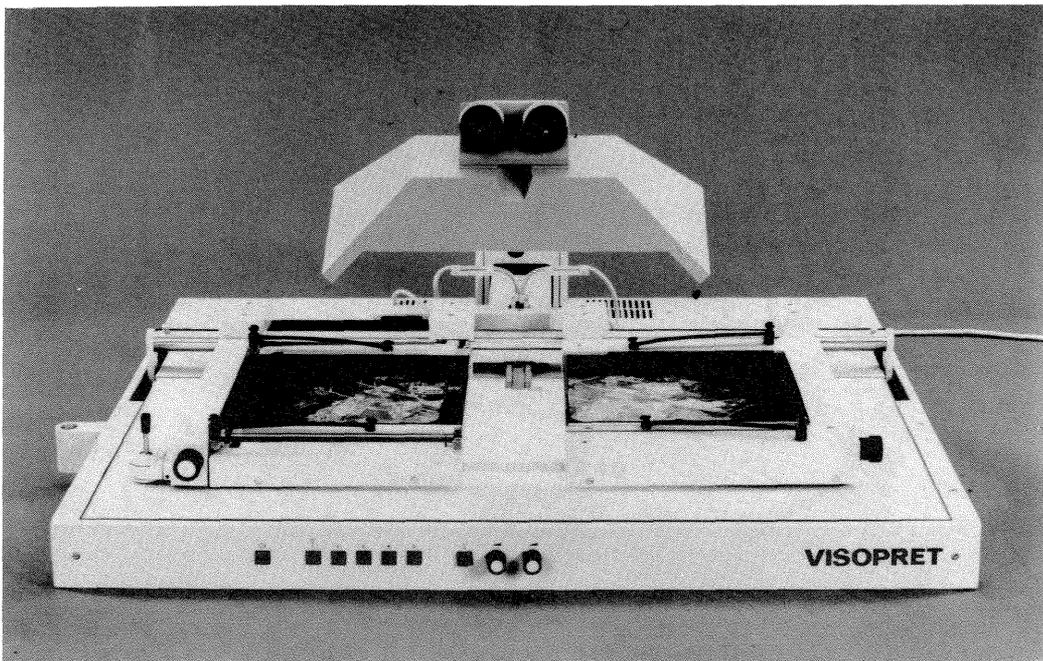
Fig 3 Zeiss Jena VISOPRET 20